

CLAIMS:

1. Apparatus for manipulating a target object in an in-cell region of a vitrification plant, comprising:

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a base securable to a trolley; and

a hydraulic arm mounted on said base arranged for being controlled remotely by a user located outside said 10 in-cell region; wherein

15 said arm includes, at an end distal from said base, a tool coupling arranged to receive a tool for performing work on said target object.

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2. The apparatus as claimed in claim 1 wherein said in-cell region includes a melter trolley, arranged to receive a canister into which a melt, formed during a vitrification process, is poured, and a plurality of 20 connectors which are arranged for providing cooling fluid from a fluid source external to said in-cell region to an induction furnace located in the in-cell region.

25 3. The apparatus as claimed in claim 1 or 2 wherein said hydraulic arm is arranged to have three degrees of movement.

4. The apparatus as claimed in claim 1, 2 or 3 further comprising:

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a hydraulic power pack for raising and lowering said arm with respect to said base and including hydraulic fluid.

5. The apparatus as claimed in claim 4 wherein said hydraulic fluid is water.

6. The apparatus as claimed in claim 2 wherein said 5 target object comprises a portion of one of said connectors, each of said connectors comprising a through wall connection connecting said fluid source to an in-cell location through a protective wall.

10 7. The apparatus as claimed in claim 6 wherein said portion comprises a portion of said connector between an in-cell surface of said protective wall and said location.

15 8. The apparatus as claimed in any one of claims 1 to 7 further comprising:

20 a plurality of clamp devices each being controllable remotely to secure the base to an in-cell slewing ring of the melter trolley.

9. The apparatus as claimed in any one of claims 1 to 8 wherein said tool comprises any one of a clamp, vacuum nozzle, reciprocating saw and/or chisel.

25 10. A chisel tool arranged for securing to the tool coupling of the apparatus claimed in any one of claims 1 to 8, and comprising:

30 a drive unit arranged to receive a chisel bit and to drive a chisel so received in a reciprocating motion;

a support including securing means for securing the drive unit to the support; and

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5 a coupling member arranged to engage with the tool coupling of said apparatus for manipulating a target object to thereby hold said chisel tool in a predetermined fixed relationship with respect of said arm.

11. The chisel tool as claimed in claim 10 further comprising:

10 a lifting member located on said support for providing a means by which said chisel tool can be located proximate to said apparatus and thereafter coupled to said apparatus.

15 12. A saw tool arranged for securing to the tool coupling of the apparatus as claimed in any one claims 1 to 8, and comprising:

20 a drive unit arranged to receive a saw blade member and to drive a saw blade member so received in a reciprocating motion;

25 a support including securing means for securing the drive unit to the support; and

30 a coupling member arranged to engage with the tool coupling of the apparatus for manipulating a target object to thereby hold said saw tool in a predetermined fixed relationship with respect to said arm.

35 13. The saw tool as claimed in claim 12 further comprising:

35 a lifting member located on said support for providing a means by which said saw tool may be located

proximate to said apparatus and thereafter coupled to said apparatus.

14. A holding tool arranged for securing to the tool
5 coupling of the apparatus as claimed in any one of claims
1 to 8 further comprising:

means for lifting arranged to be advanced under and engage with a lower surface of said target object and for
10 lifting said target object when an arm of the apparatus for manipulating a target object to which said holding tool is coupled is raised; and

15 a support back plate having a lower edge from which said means for lifting extends at a substantially perpendicular angle.

15. The holding tool as claimed in claim 14 further comprising:

20 a rest member extending upwardly from said means for lifting and angled backwardly with respect to said means for lifting whereby as a target object is lifted a portion of said target object engages with a region of
25 said rest member and rocks backwardly about this point and away from said lifting member until the target object is supported by said rest member.

16. The holding tool as claimed in claim 15 further comprising:

30 a locking mechanism including a locking finger which is arranged to lock a target object at a predetermined located when said target object is supported by said rest
35 member.

17. Apparatus constructed and arranged substantially as hereinbefore described with reference to the accompanying drawings.

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18. A method substantially as hereinbefore described with reference to the accompanying drawings.